

## Claims

1. A recording liquid deposited on a support in the state of liquid droplets for effecting printing on said support, wherein

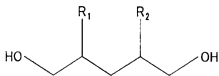
the recording liquid contains colorant matter and a solvent for dispersing said colorant matter, and has a 0-second dynamic surface tension not less than 30 mN/m and not more than 40 mN/m.

2. The recording liquid according to claim 1 wherein the recording liquid contains, in addition to said colorant matter and said solvent, a polyhydric alcohol having an I/O ratio, namely a ratio of an inorganic value (IV) to an organic value (OV), equal to not less than 1.18 and not more than 2.5, and containing a hydrocarbon group with the number of carbon atoms less than 9.

3. The recording liquid according to claim 2 wherein said polyhydric alcohol contains a branched hydrocarbon group.

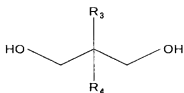
4. The recording liquid according to claim 2 containing, as said polyhydric alcohol, one or more of organic compounds represented by the chemical formulas 1 to 5:

[chemical formula 1]



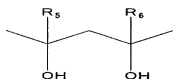
wherein  $R_1$  and  $R_2$  denote hydrocarbon groups, with  $2 \leq R_1 + R_2 \leq 4$ ,  $R_1 \geq 0$  and  $R_2 \geq 0$ , provided that, if  $R_1 = 0$  and  $R_2 = 0$ ,  $R_1$  and  $R_2$  each denote a hydrogen atom;

[chemical formula 2]



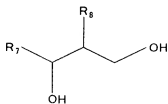
wherein  $R_3$  and  $R_4$  denote hydrocarbon groups, with  $2 \leq R_3 + R_4 \leq 6$ ,  $R_3 \geq 0$  and  $R_4 \geq 0$ , provided that, if  $R_3 = 0$  and  $R_4 = 0$ ,  $R_3$  and  $R_4$  each denote a hydrogen atom;

[chemical formula 3]



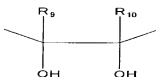
wherein  $R_5$  and  $R_6$  denote hydrocarbon groups, with  $1 \leq R_5 + R_6 \leq 4$ ,  $R_5 \geq 0$  and  $R_6 \geq 0$ , provided that, if  $R_5 = 0$  and  $R_6 = 0$ ,  $R_5$  and  $R_6$  each denote a hydrogen atom;

[chemical formula 4]



wherein  $R_7$  and  $R_8$  denote hydrocarbon groups, with  $2 \leq R_7 + R_8 \leq 6$ ; and

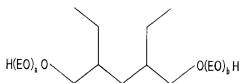
[chemical formula 5]



wherein  $R_9$  and  $R_{10}$  denote hydrocarbon groups, with  $2 \leq R_9 + R_{10} \leq 4$ .

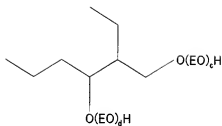
5. The recording liquid according to claim 1 wherein the static surface tension is not less than 30 mN/m and not more than 35 mN/m.
6. The recording liquid according to claim 1 containing, as a surfactant, an alkylene oxide adduct of a polyhydric alcohol, said alkylene oxide adduct of the polyhydric alcohol containing a hydrocarbon group with nine or less carbon atoms and having the ratio (I/O) of the inorganic value (IV) to the organic value (OV) not less than 1 and not more than 1.33.
7. The recording liquid according to claim 6 wherein said alkylene oxide adduct of polyhydric alcohol contains a branched hydrocarbon group.
8. The recording liquid according to claim 6 containing, as said alkylene oxide adduct of polyhydric alcohol, one or more of organic compounds represented by the chemical formulas 6 to 8:

[chemical formula 6]



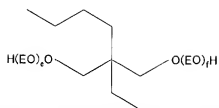
wherein EO denotes an ethylene oxide group, with  $1 \leq a+b \leq 6$ ;

[chemical formula 7]



wherein EO denotes an ethylene oxide group, with  $1 \leq c+d \leq 6$ ; and

[chemical formula 8]



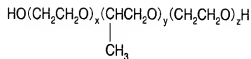
wherein EO denotes an ethylene oxide group, with  $1 \leq e+f \leq 5$ .

9. The recording liquid according to claim 6 wherein the static surface tension is

not less than 30 mN/m and not more than 35 mN/m.

10. The recording liquid according to claim 2 containing, as a surfactant, at least one ethylene oxide/ propylene oxide copolymer represented by the chemical formula 9:

[chemical formula 9]



where x, y and z are integers, with  $3 \leq x+z \leq 12$  and  $8 \leq y \leq 21$ , and where the content in a molecule of ethylene oxide units ranges between 20 wt% and 40 wt%.

11. A liquid cartridge detachably mounted on a liquid emitting head provided on a liquid emitting device, said liquid cartridge operating as a supply source for supplying a recording liquid, accommodated in a liquid vessel, to said liquid emitting head, said liquid emitting device being adapted to emit said recording liquid from said liquid vessel in the form of liquid droplets to deposit the emitted ink onto a support to effect printing, wherein

said recording liquid contains colorant matter and a solvent for dispersing said colorant matter, and has a 0-second dynamic surface tension not less than 30 mN/m and not more than 40 mN/m.

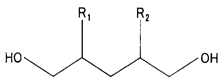
12. The liquid cartridge according to claim 11 wherein the recording liquid contains, in addition to said colorant matter and said solvent, a polyhydric alcohol

having an I/O ratio, namely a ratio of an inorganic value (IV) to an organic value (OV), equal to not less than 1.18 and not more than 2.5, and containing a hydrocarbon group with the number of carbon atoms being not more than 9.

13. The liquid cartridge according to claim 12 wherein said polyhydric alcohol contains a branched hydrocarbon group.

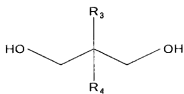
14. The liquid cartridge according to claim 12 wherein said recording liquid contains, as said polyhydric alcohol, one or more of organic compounds represented by the chemical formulas 10 to 14:

[chemical formula 10]



wherein  $R_1$  and  $R_2$  denote hydrocarbon groups, with  $2 \leq R_1 + R_2 \leq 4$ ,  $R_1 \geq 0$  and  $R_2 \geq 0$ , provided that, if  $R_1 = 0$  and  $R_2 = 0$ ,  $R_1$  and  $R_2$  each denote a hydrogen atom;

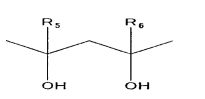
[chemical formula 11]



wherein  $R_3$  and  $R_4$  denote hydrocarbon groups, with  $2 \leq R_3 + R_4 \leq 6$ ,  $R_3 \geq 0$  and  $R_4 \geq 0$ .

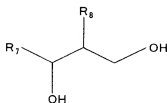
0, provided that, if  $R_3 = 0$  and  $R_4 = 0$ ,  $R_3$  and  $R_4$  each denote a hydrogen atom;

[chemical formula 12]



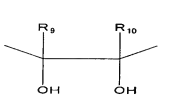
wherein  $R_5$  and  $R_6$  denote hydrocarbon groups, with  $1 \leq R_5 + R_6 \leq 4$ ,  $R_5 \geq 0$  and  $R_6 \geq 0$ , provided that, if  $R_5 = 0$  and  $R_6 = 0$ ,  $R_5$  and  $R_6$  each denote a hydrogen atom;

[chemical formula 13]



wherein  $R_7$  and  $R_8$  denote hydrocarbon groups, with  $2 \leq R_7 + R_8 \leq 6$ ; and

[chemical formula 14]



wherein  $R_9$  and  $R_{10}$  denote hydrocarbon groups, with  $2 \leq R_9 + R_{10} \leq 4$ .

15. The liquid cartridge according to claim 11 wherein the static surface tension is not less than 30 mN/m and not more than 35 mN/m.

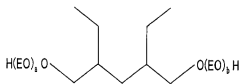
16. The liquid cartridge according to claim 11 containing, as a surfactant, an

alkylene oxide adduct of a polyhydric alcohol, said alkylene oxide adduct of the polyhydric alcohol containing a hydrocarbon group with nine or less carbon atoms and having the ratio (I/O) of the inorganic value (IV) to the organic value (OV) not less than 1 and not more than 1.33.

17. The liquid cartridge according to claim 16 wherein said alkylene oxide adduct of polyhydric alcohol contains a branched hydrocarbon group.

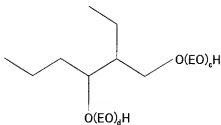
18. The liquid cartridge according to claim 16 containing, as said alkylene oxide adduct of polyhydric alcohol, one or more of organic compounds represented by the chemical formulas 15 to 17:

[chemical formula 15]



wherein EO denotes an ethylene oxide group, with  $1 \leq a+b \leq 6$ ;

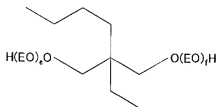
[chemical formula 16]





wherein EO denotes an ethylene oxide group, with  $1 \leq c+d \leq 6$ ; and

[chemical formula 17]

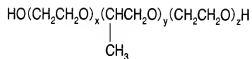


wherein EO denotes an ethylene oxide group, with  $1 \leq c+f \leq 5$ .

19. The liquid cartridge according to claim 16 wherein the static surface tension is not less than 30 mN/m and not more than 35 mN/m.

20. The liquid cartridge according to claim 12 containing, as a surfactant, at least one ethylene oxide/ propylene oxide copolymer represented by the chemical formula 18:

[chemical formula 18]



wherein x, y and z are integers, with  $3 \leq x+z \leq 12$  and  $8 \leq y \leq 21$ , and wherein the content of ethylene oxide units in a molecule ranges between 20 wt% and 40 wt%.

21. A liquid emitting device including a liquid emitting head, having an emitting opening for emitting a recording liquid therethrough in the form of liquid droplets

and adapted for emitting the liquid droplets through said emitting opening onto a support transported to a location facing said emitting opening, and a liquid cartridge connected to said liquid emitting head and operating as a supply source for supplying said recording liquid to said liquid emitting head, wherein

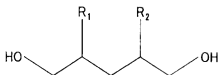
the recording liquid contains colorant matter and a solvent for dispersing said colorant matter, and has a 0-second dynamic surface tension not less than 30 mN/m and not more than 40 mN/m.

22. The liquid emitting device according to claim 21 wherein the recording liquid contains, in addition to said colorant matter and said solvent, a polyhydric alcohol having an I/O ratio, namely a ratio of an inorganic value (IV) to an organic value (OV), equal to not less than 1.18 and not more than 2.5, and containing a hydrocarbon group with the number of carbon atoms not more than 9.

23. The liquid emitting device according to claim 22 wherein said polyhydric alcohol contains a branched hydrocarbon group.

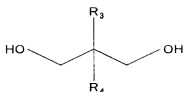
24. The liquid emitting device according to claim 22 containing, as said polyhydric alcohol, one or more of organic compounds represented by the chemical formulas 19 to 23:

[chemical formula 19]



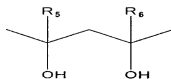
wherein  $R_1$  and  $R_2$  denote hydrocarbon groups, with  $2 \leq R_1 + R_2 \leq 4$ ,  $R_1 \geq 0$  and  $R_2 \geq 0$ , provided that, if  $R_1 = 0$  and  $R_2 = 0$ ,  $R_1$  and  $R_2$  each denote a hydrogen atom;

[chemical formula 20]



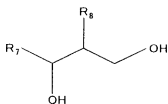
wherein  $R_3$  and  $R_4$  denote hydrocarbon groups, with  $2 \leq R_3 + R_4 \leq 6$ ,  $R_3 \geq 0$  and  $R_4 \geq 0$ , provided that, if  $R_3 = 0$  and  $R_4 = 0$ ,  $R_3$  and  $R_4$  each denote a hydrogen atom;

[chemical formula 21]



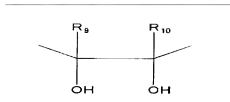
wherein  $R_5$  and  $R_6$  denote hydrocarbon groups, with  $1 \leq R_5 + R_6 \leq 4$ ,  $R_5 \geq 0$  and  $R_6 \geq 0$ , provided that, if  $R_5 = 0$  and  $R_6 = 0$ ,  $R_5$  and  $R_6$  each denote a hydrogen atom;

[chemical formula 22]



wherein  $R_7$  and  $R_8$  denote hydrocarbon groups, with  $2 \leq R_7 + R_8 \leq 6$ ; and

[chemical formula 23]



wherein  $R_9$  and  $R_{10}$  denote hydrocarbon groups, with  $2 \leq R_9 + R_{10} \leq 4$ .

25. The liquid emitting device according to claim 21 wherein the static surface tension is not less than 30 mN/m and not more than 35 mN/m.

26. The liquid emitting device according to claim 21 containing, as a surfactant, an alkylene oxide adduct of a polyhydric alcohol, said alkylene oxide adduct of the polyhydric alcohol containing a hydrocarbon group with nine or less carbon atoms and having the ratio (I/O) of the inorganic value (IV) to the organic value (OV) not less than 1 and not more than 1.33.

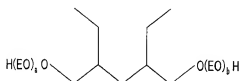
27. The liquid emitting device according to claim 26 wherein said alkylene oxide adduct of polyhydric alcohol contains a branched hydrocarbon group.

28. The liquid emitting device according to claim 26 containing, as said alkylene

oxide adduct of polyhydric alcohol, one or more of organic compounds represented by the chemical formulas 24 to 26:

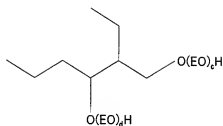
[chemical formula 24]

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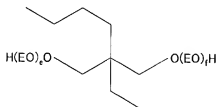
wherein EO denotes an ethylene oxide group, with  $1 \leq a+b \leq 6$ ;

[chemical formula 25]



wherein EO denotes an ethylene oxide group, with  $1 \leq c+d \leq 6$ ; and

[chemical formula 26]



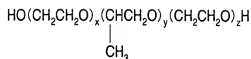
wherein EO denotes an ethylene oxide group, with  $1 \leq e+f \leq 5$ .

29. The liquid emitting device according to claim 26 wherein the static surface tension is not less than 30 mN/m and not more than 35 mN/m.

30. The liquid emitting device according to claim 21 wherein there are provided a plurality of said emitting openings which are arrayed substantially in a line.

31. The liquid emitting device according to claim 22 wherein said recording liquid contains, as a surfactant, at least one ethylene oxide/ propylene oxide copolymer represented by the chemical formula 9:

[chemical formula 27]



wherein x, y and z are integers, with  $3 \leq x+z \leq 12$  and  $8 \leq y \leq 21$ , and wherein the content of ethylene oxide units in a molecule ranges between 20 wt% and 40 wt%.

32. A liquid emitting method to be carried out by a liquid emitting device including a liquid emitting head, having an emitting opening for emitting a recording liquid therethrough in the form of liquid droplets and adapted for emitting the liquid droplets through said emitting opening onto a support transported to a location facing said emitting opening, and a liquid cartridge connected to said liquid emitting head and operating as a supply source for supplying said recording liquid to said liquid emitting head, comprising:

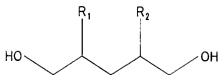
emitting said recording liquid via said emitting opening of said liquid emitting head; said recording liquid containing colorant matter and a solvent for dispersing said colorant matter, and having a 0-second dynamic surface tension not less than 30 mN/m and not more than 40 mN/m.

33. The liquid emitting method according to claim 32 wherein the recording liquid contains, in addition to said colorant matter and said solvent, a polyhydric alcohol having an I/O ratio, namely a ratio of an inorganic value (IV) to an organic value (OV), equal to not less than 1.18 and not more than 2.5, and containing a hydrocarbon group with the number of carbon atoms not more than 9.

34. The liquid emitting method according to claim 33 wherein said polyhydric alcohol contains a branched hydrocarbon group.

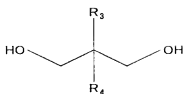
35. The liquid emitting method according to claim 33 containing, as said polyhydric alcohol, one or more of organic compounds represented by the chemical formulas 28 to 32:

[chemical formula 28]



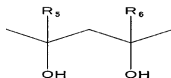
wherein R<sub>1</sub> and R<sub>2</sub> denote hydrocarbon groups, with  $2 \leq R_1 + R_2 \leq 4$ ,  $R_1 \geq 0$  and  $R_2 \geq 0$ , provided that, if  $R_1 = 0$  and  $R_2 = 0$ , R<sub>1</sub> and R<sub>2</sub> each denote a hydrogen atom;

[chemical formula 29]



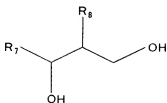
wherein  $R_3$  and  $R_4$  denote hydrocarbon groups, with  $2 \leq R_3 + R_4 \leq 6$ ,  $R_3 \geq 0$  and  $R_4 \geq 0$ , provided that, if  $R_3 = 0$  and  $R_4 = 0$ ,  $R_3$  and  $R_4$  each denote a hydrogen atom;

[chemical formula 30]



wherein  $R_5$  and  $R_6$  denote hydrocarbon groups, with  $1 \leq R_5 + R_6 \leq 4$ ,  $R_5 \geq 0$  and  $R_6 \geq 0$ , provided that, if  $R_5 = 0$  and  $R_6 = 0$ ,  $R_5$  and  $R_6$  each denote a hydrogen atom;

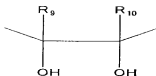
[chemical formula 31]



wherein  $R_7$  and  $R_8$  denote hydrocarbon groups, with  $2 \leq R_7 + R_8 \leq 6$ ; and

[chemical formula 32]





wherein  $R_9$  and  $R_{10}$  denote hydrocarbon groups, with  $2 \leq R_9 + R_{10} \leq 4$ .

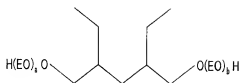
36. The liquid emitting method according to claim 32 wherein the static surface tension is not less than 30 mN/m and not more than 35 mN/m.

37. The liquid emitting method according to claim 32 wherein said recording liquid, containing, as a surfactant, an alkylene oxide adduct of a polyhydric alcohol, said alkylene oxide adduct of the polyhydric alcohol containing a hydrocarbon group with nine or less carbon atoms and having the ratio (I/O) of the inorganic value (IV) to the organic value (OV) not less than 1 and not more than 1.33, is emitted via said emitting opening.

38. The liquid emitting method according to claim 37 wherein said alkylene oxide adduct of polyhydric alcohol contains a branched hydrocarbon group.

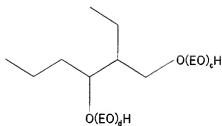
39. The liquid emitting method according to claim 37 containing, as said alkylene oxide adduct of polyhydric alcohol, one or more of organic compounds represented by the chemical formulas 33 to 35:

[chemical formula 33]



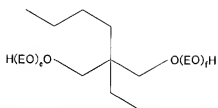
wherein EO denotes an ethylene oxide group, with  $1 \leq a+b \leq 6$ ;

[chemical formula 34]



wherein EO denotes an ethylene oxide group, with  $1 \leq c+d \leq 6$ ; and

[chemical formula 35]



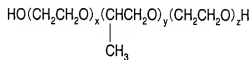
wherein EO denotes an ethylene oxide group, with  $1 \leq e+f \leq 5$ .

40. The liquid emitting method according to claim 34 wherein said recording liquid

having the static surface tension not less than 30 mN/m and not more than 35 mN/m is emitted via said emitting opening.

41. The liquid emitting method according to claim 33 wherein said recording liquid containing, as a surfactant, at least one ethylene oxide/ propylene oxide copolymer represented by the chemical formula 36:

[chemical formula 36]




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is emitted via said emitting opening, wherein x, y and z are integers, with  $3 \leq x+z \leq 12$  and  $8 \leq y \leq 21$ , and wherein the content of ethylene oxide units in a molecule ranges between 20 wt% and 40 wt%.